relay magic

RELAYS • SWITCHES • CONTROL SYSTEMS

AUTOMATIC ELECTRIC

NORTHLAKE, ILLINOIS

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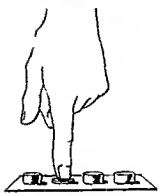
relay magic

AE CAN DO



MAKING IDEAS WORK AUTOMATICALLY

FOREWORD

Relay Magic is one of a series of pocket books prepared by the Industrial Products Division of Automatic Electric. The booklets are designed to provide useful engineering information in a handy form. Others include Relay Terms, Basic Circuits, Conversion Factors, and Tables & Formulae.

We recommend that the information in this book be used only as a guide to determine the eveilability of e circuit end its components. Remember, even the best end most time-proven circuit may fail beceuse of the wrong choice of equipment. For this reason we meke no ettempt to define specific electrical perameters or component values.

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AE CAN DO

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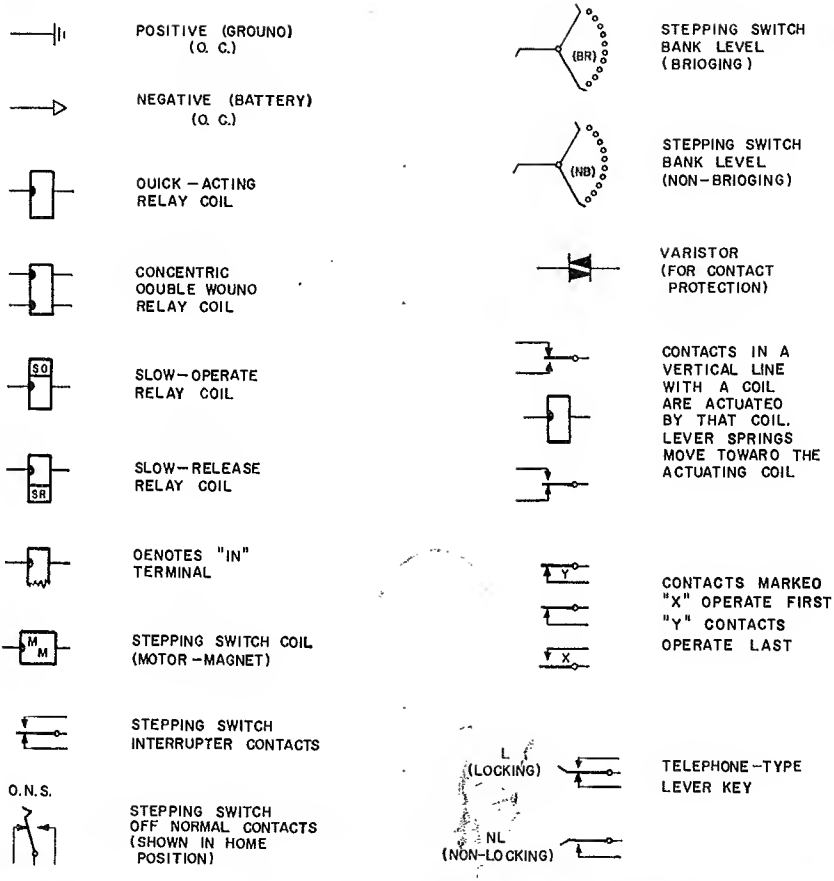


Fig. 1. Symbols, abbreviations and drawing practices.

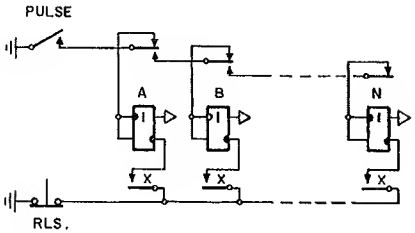
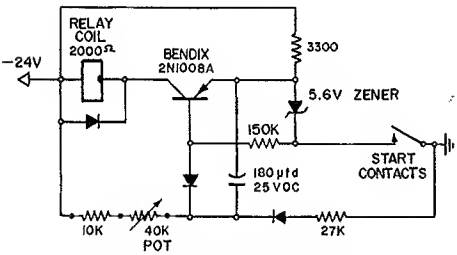


Fig. 2. Counting chain, one relay per step.



OPERATE DELAY ADJUSTABLE FROM QUICK ACTING TO APPROX. 10 SECS. TEMP. COMP. − 0° − 100° F

Fig. 3. Zener-stabilized slow-operate relay.

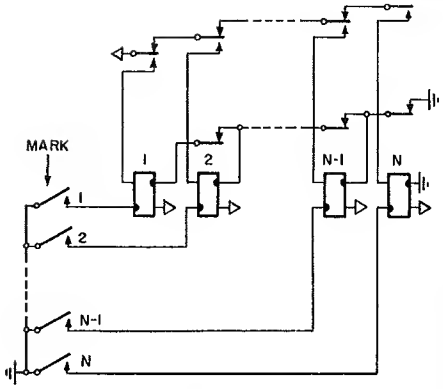


Fig. 4. Random or "jump" finder.

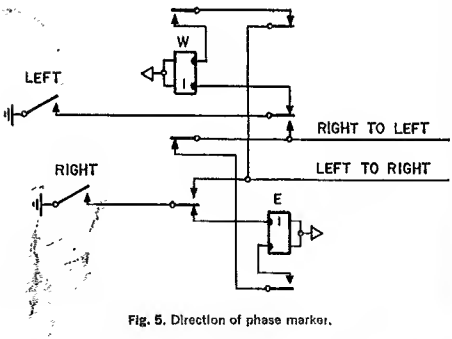


Fig. 5. Direction of phase marker.

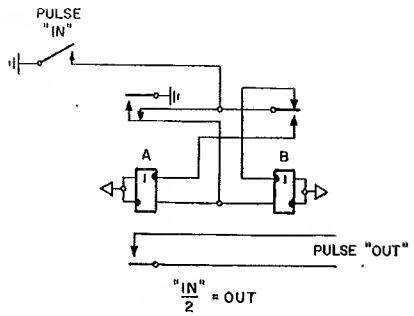


Fig. 6. Pulse divider (2-relay).

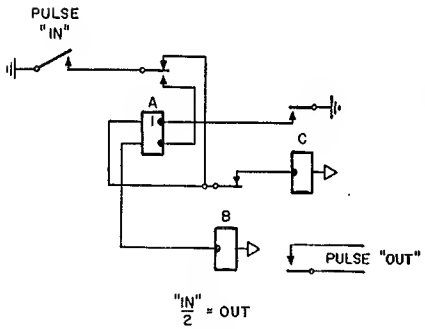


Fig. 7. Pulse divider (3-relay).

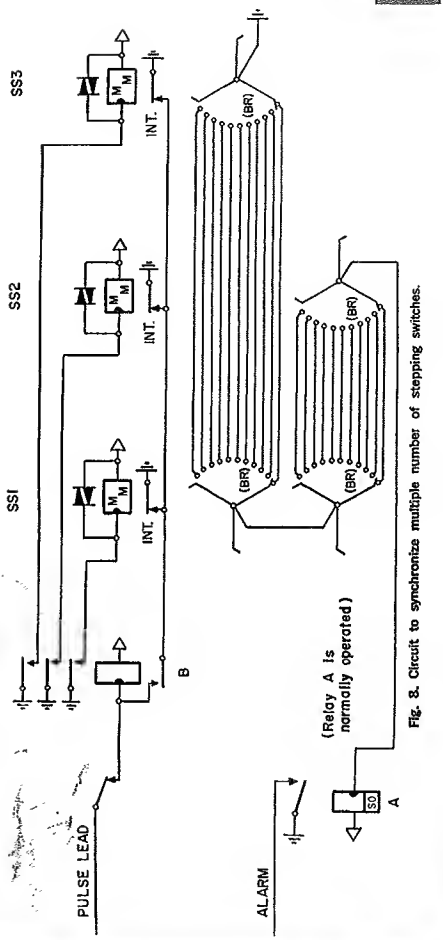


Fig. 8. Circuit to synchronize multiple number of stepping switches.

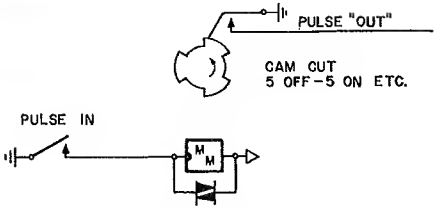


Fig. 9. 30-point OCS Relay used as a 5-to-1 divider.

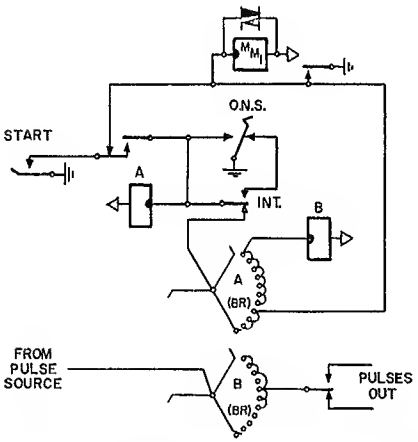


Fig. 10. Code sender or pulse multiplier. (Characteristics of "B" control the pulse frequency and % make.)

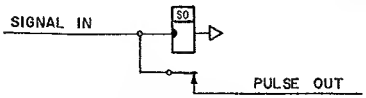


Fig. 11. Pulse shortener.

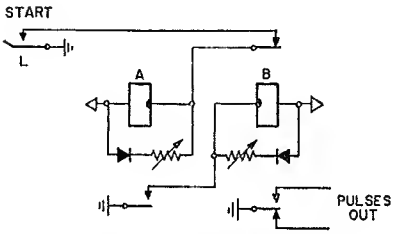


Fig. 12. Simple variable-pulse generator.

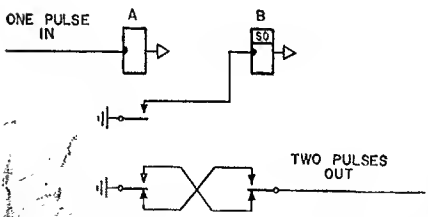


Fig. 13. Pulse doubler. (Relay "B" is slow to operate and slow to release.)

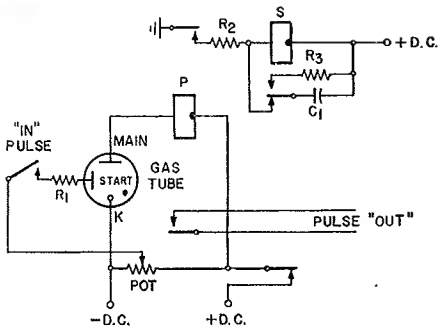


Fig. 14. Gas-tube pulse stretcher

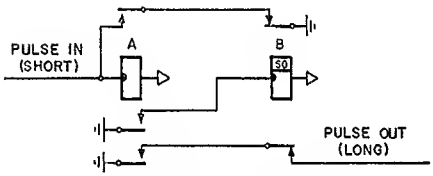


Fig. 15. Pulse stretcher (2-relay).

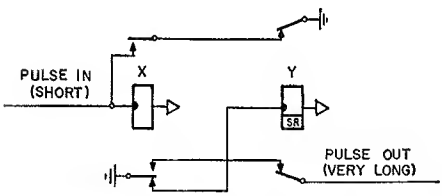


Fig. 16. Pulse stretcher (2-relay).

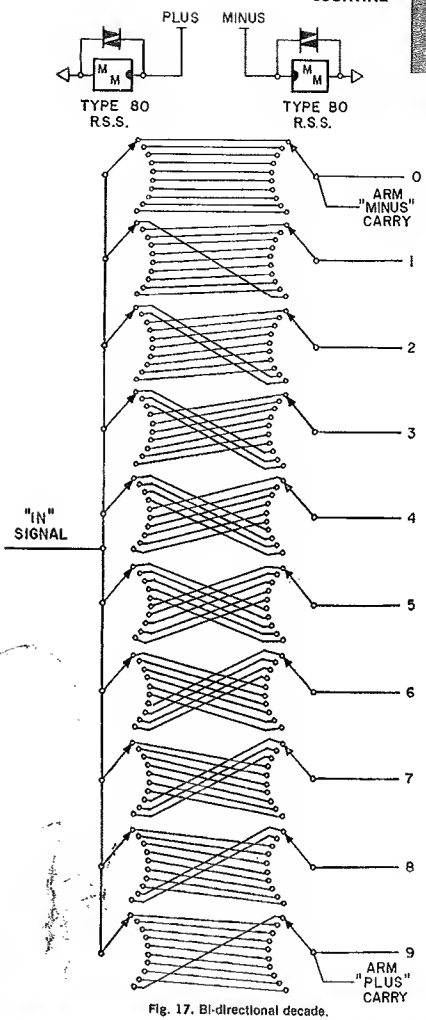


Fig. 17. Bi-directional decade.

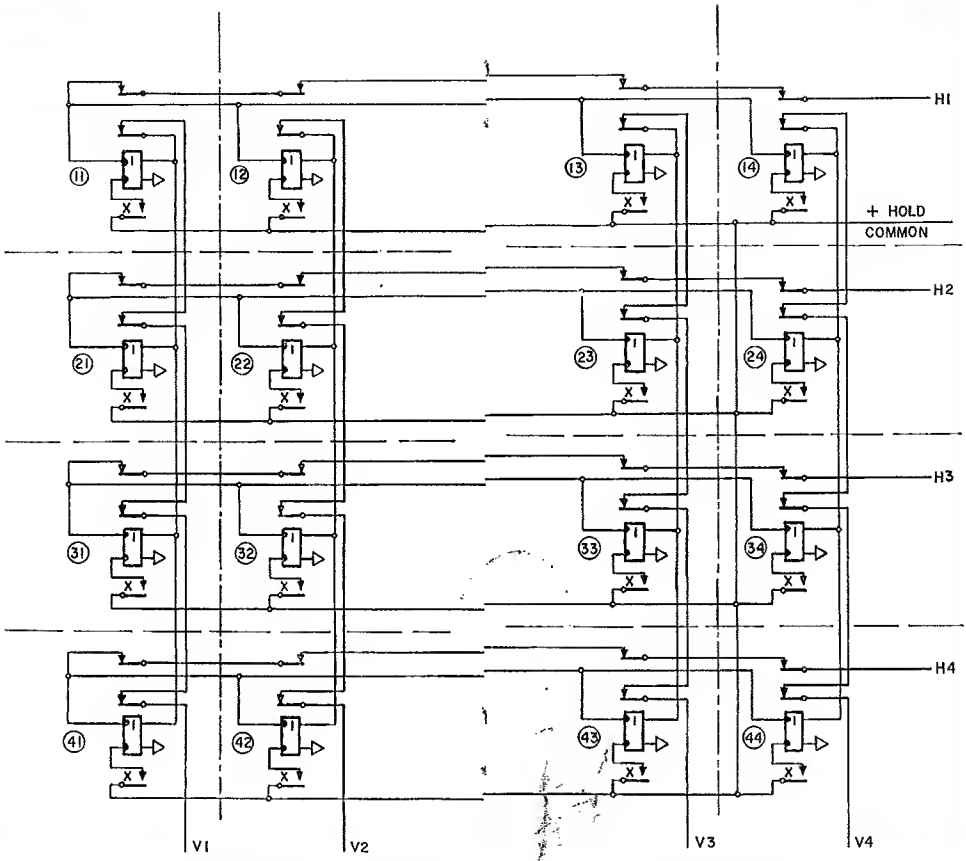


Fig. 18. Relay matrix, 4 x 4 full cross program.

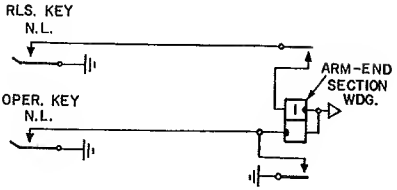


Fig. 19. Usual method of operating, holding and releasing double-wound relay.

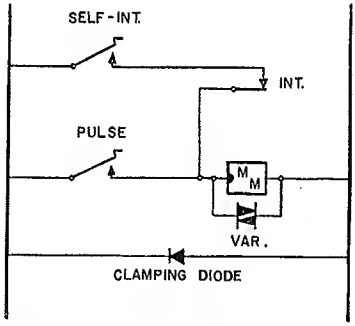
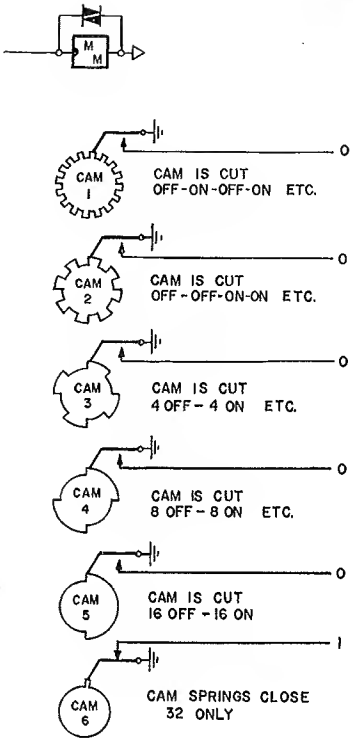


Fig. 20. Rotary stepping switch circuit with diode for reduction of electrical noise.



NOTE: This is a schematic presentation for simplicity. Cams may be rearranged for proper load distribution.

Fig. 21. AE's 32-point OCS Relay used as a binary readout. (Shown in position 32).

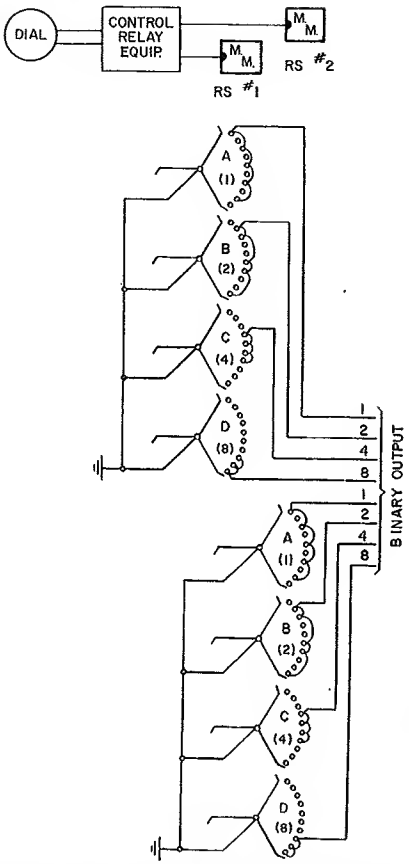


Fig. 22. Decimal-to-binary conversion.

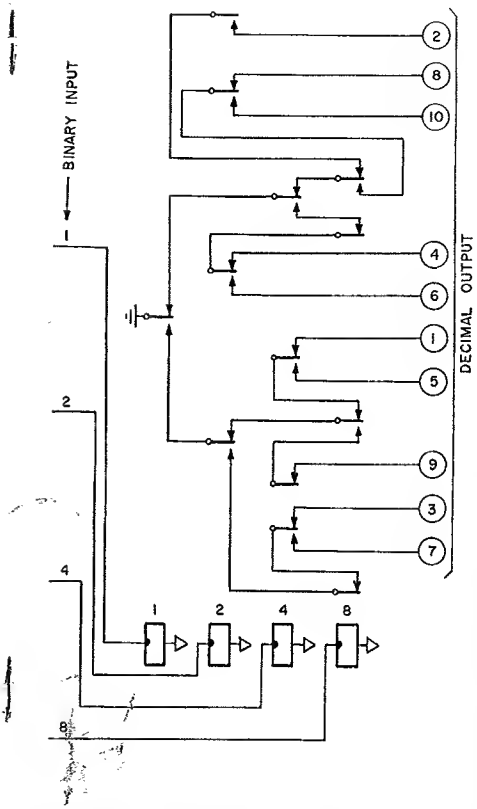


Fig. 23. Binary-to-decimal conversion.

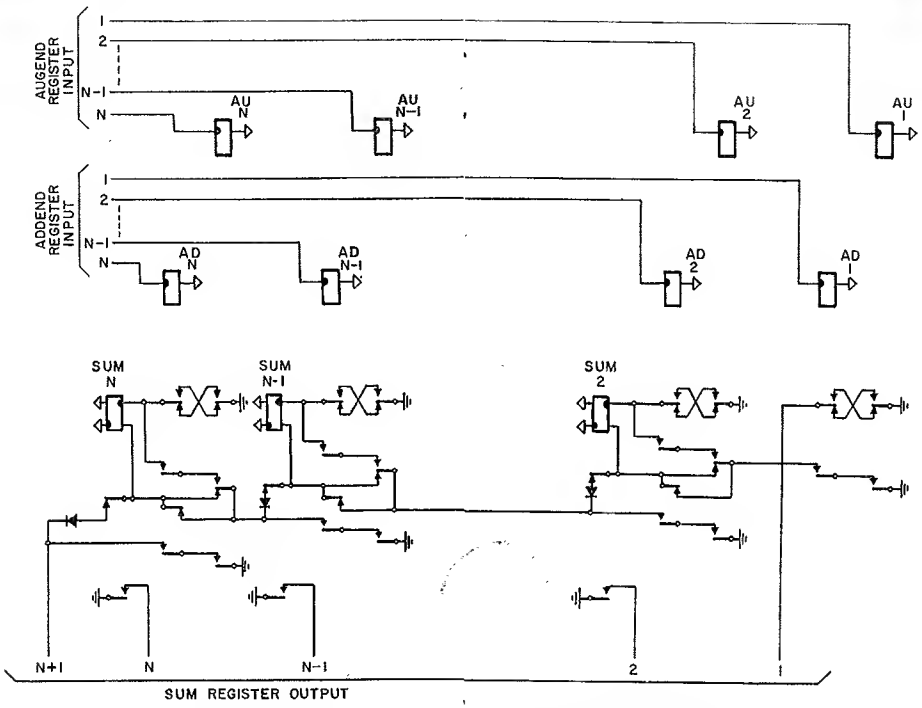


Fig. 24. Addition of numbers in binary form.

"IN" CARRY	AUGEND	ADDEND	SUM	"OUT" CARRY
NO	0	0	0	NO
NO	1	0	1	NO
NO	0	1	1	NO
NO	1	1	(1) 0	YES
YES	0	0	1	NO
YES	1	0	(1) 0	YES
YES	0	1	(1) 0	YES
YES	1	1	(1) 1	YES

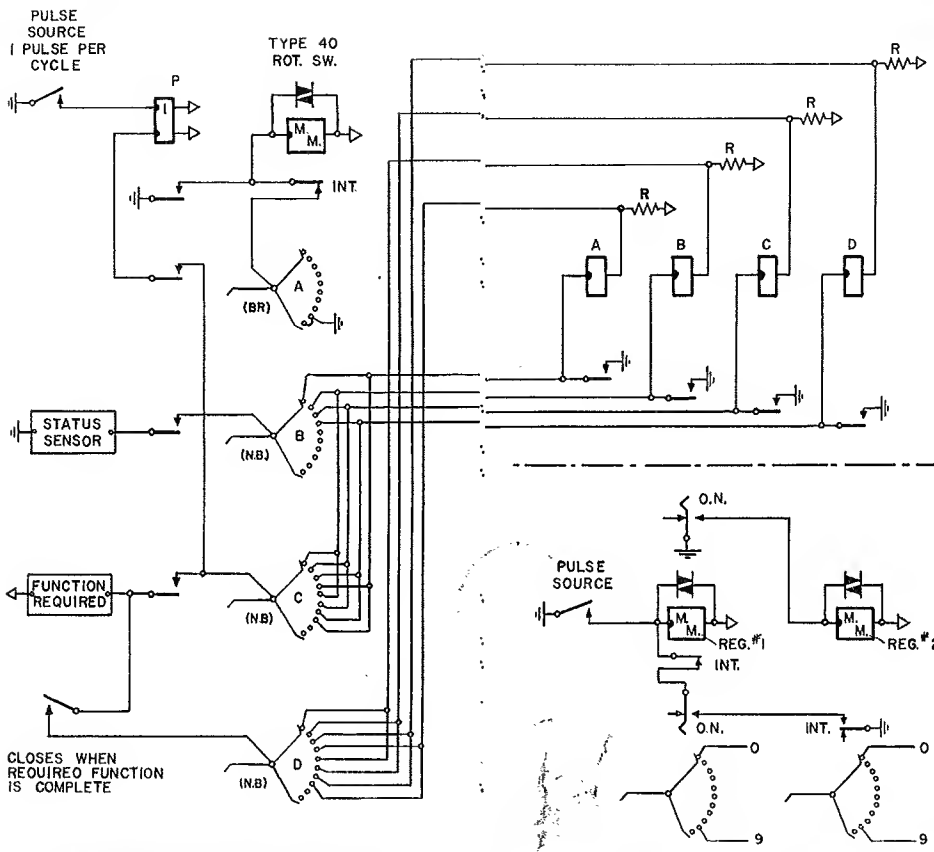


Fig. 25. Four-bit shift register using AE's Codel Relay.

Fig. 26. "Carry" to second register.

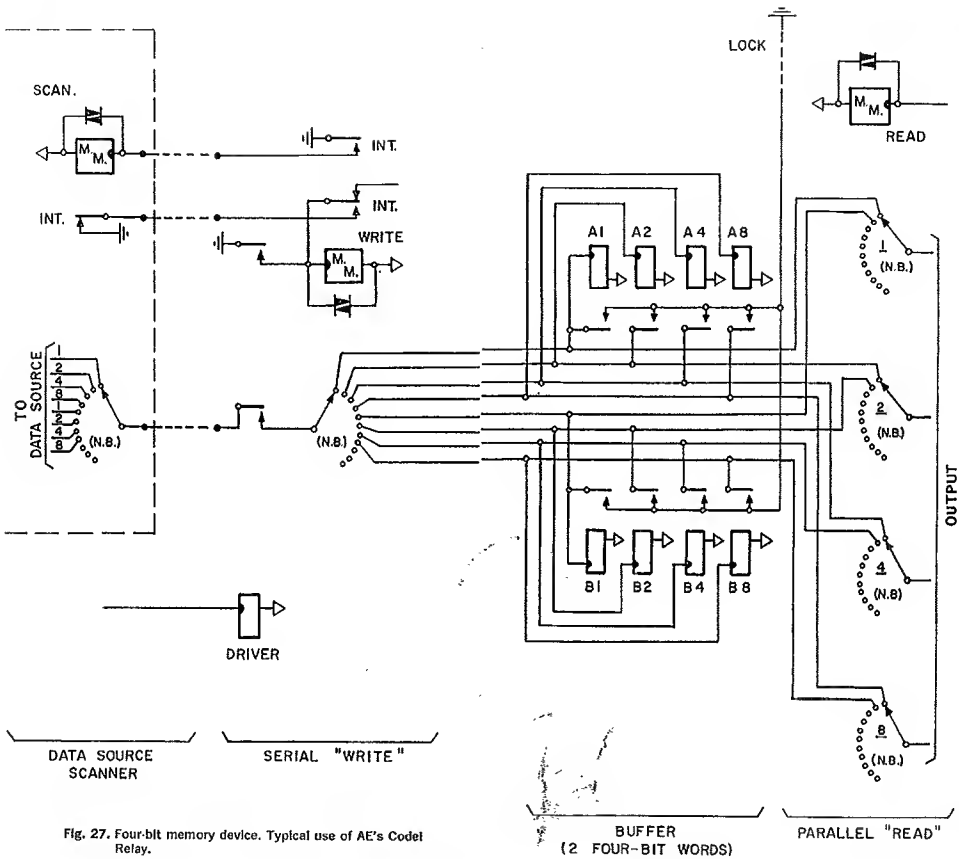
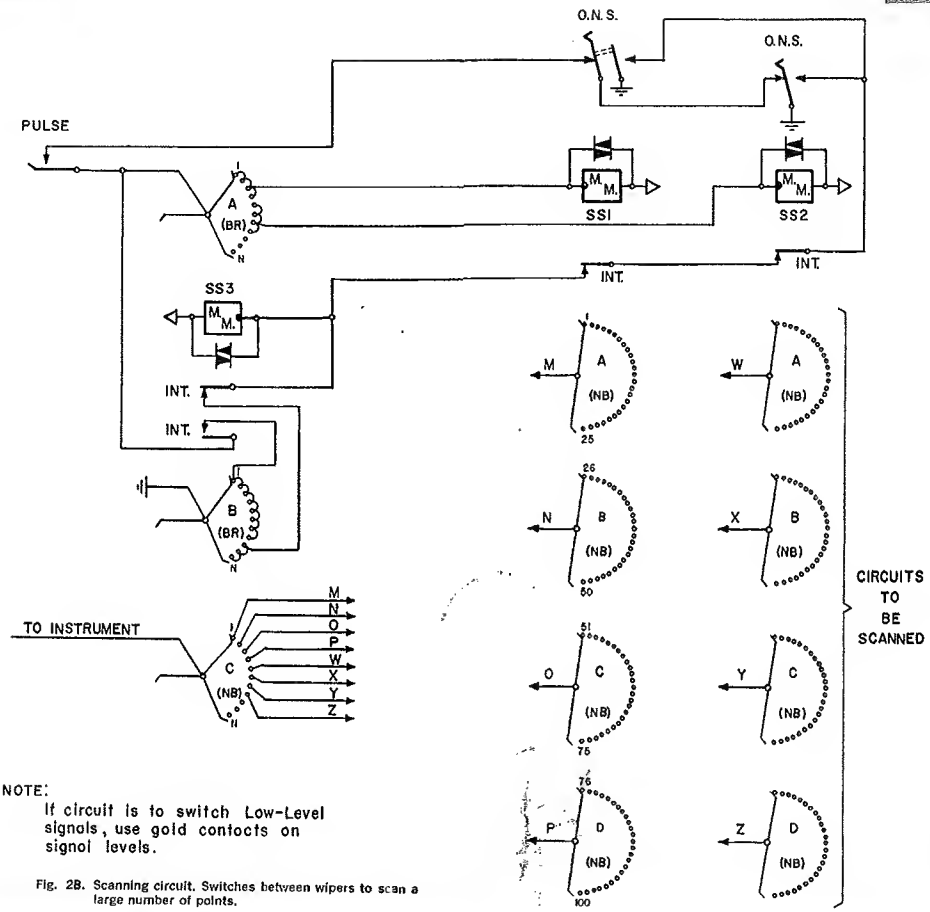
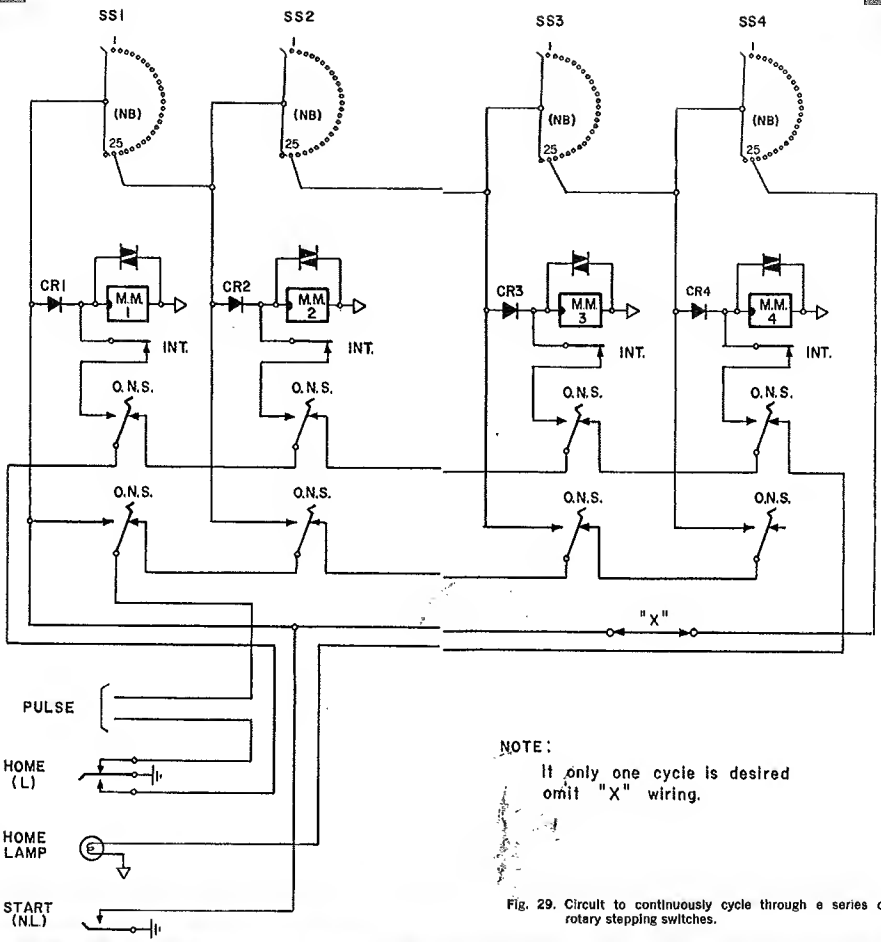


Fig. 27. Four-bit memory device. Typical use of AE's Codel Relay.



NOTE:
If circuit is to switch Low-Level signals, use gold contacts on signal levels.

Fig. 28. Scanning circuit. Switches between wipers to scan a large number of points.



NOTE:
If only one cycle is desired omit "X" wiring.

Fig. 29. Circuit to continuously cycle through e series of rotary stepping switches.

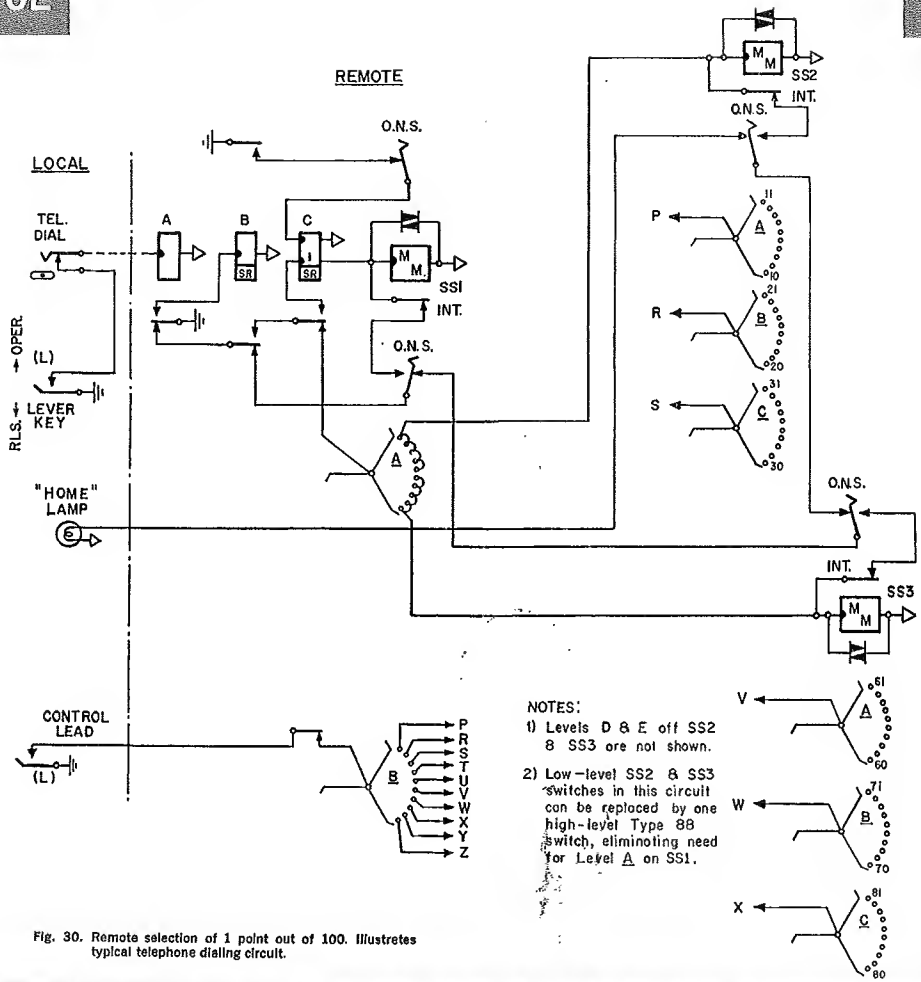


Fig. 30. Remote selection of 1 point out of 100. Illustretes typical telephone dialing circuit.

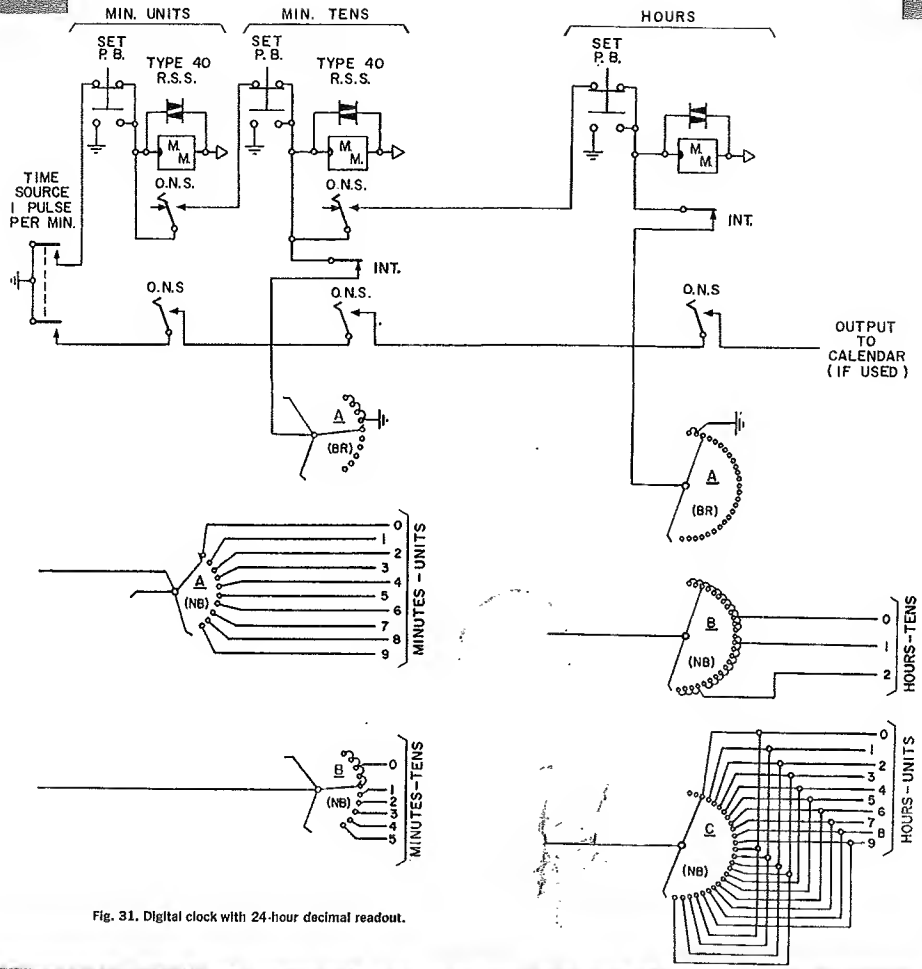


Fig. 31. Digital clock with 24-hour decimal readout.

DIGITAL CALENDAR

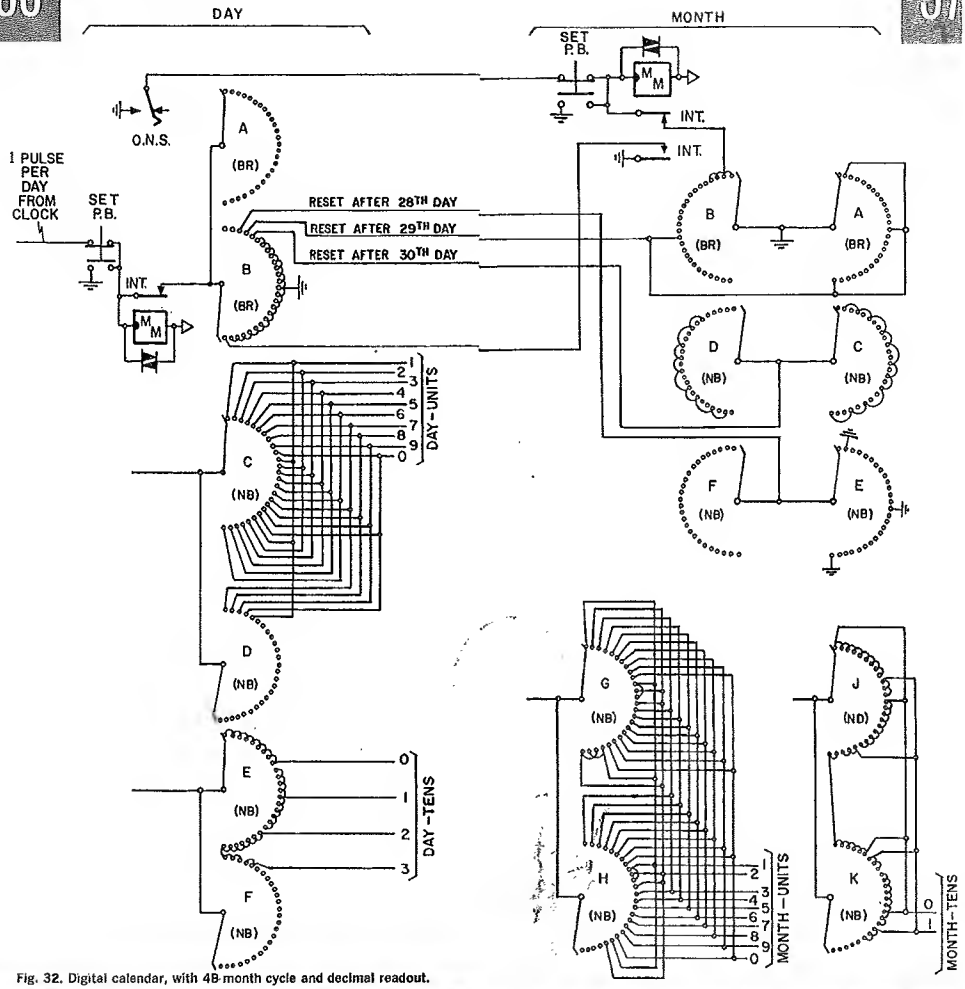


Fig. 32. Digital calendar, with 48-month cycle and decimal readout.

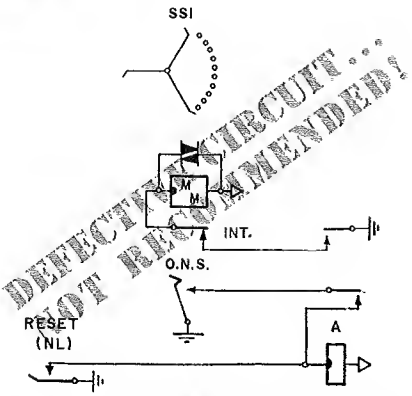


Fig. 33. Trap #1. Stopping a self-interrupted rotary stepping switch by releasing a relay.

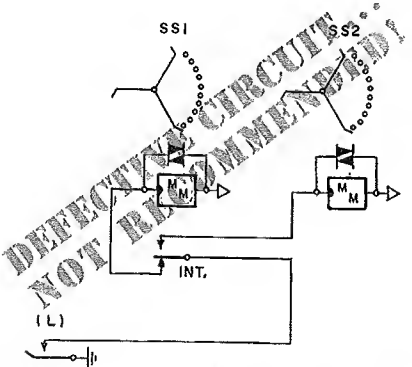


Fig. 34. Trap #2. Synchronizing self-interrupted rotary stepping switches.

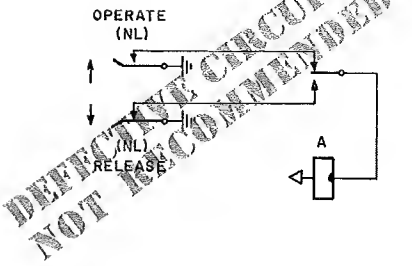


Fig. 35. Trap #3. Switching a relay's coil circuit with a Form C contract.

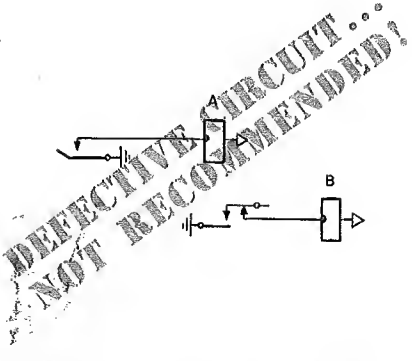


Fig. 36. Trap #4. Operating a relay with a pulse from a Form D.

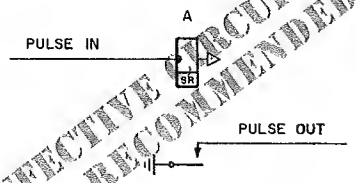


Fig. 37. Trap #5. Pulse-stretching with one relay.

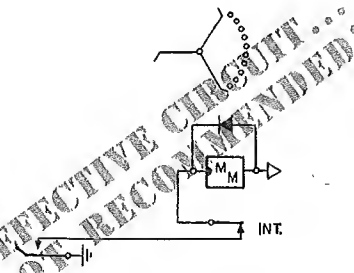


Fig. 38. Trap #6. Use of a diode as a spark-suppressor on a self interrupted rotary stepping switch.